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14. ABSTRACT Timber piling can suffer severely from ice damage. As ice forms on the water s surface, it adheres to the rough surface of the timber piling and forms an ice collar. As more ice forms and thickens and the water level changes due to tides, the ice tries to float up and down, exerting an uplift force on the piling. When the action is repeated, the piling is lifted higher (or "jacked") and may be completely loosened from the bottom. If the piling is not lifted the first season, the chafing action of the ice makes the piling more susceptible to uplift in successive seasons.					
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Coastal Engineering Technical Note



PLASTIC PILING JACKET FOR ICE PROTECTION

PURPOSE: To present a method for protecting piling against ice forces.

GENERAL: Timber piling can suffer severely from ice damage. As ice forms on the water surface, it adheres to the rough surface of the timber piling and forms an ice collar. As more ice forms and thickens and the water level changes due to tides, the ice tries to float up and down, exerting an uplift force on the piling. When the action is repeated, the piling is lifted higher (or "jacked") and may be completely loosened from the bottom. If the piling is not lifted the first season, the chafing action of the ice makes the piling more susceptible to uplift in successive seasons. Several cycles of freezing and jacking have lifted the mooring pile pictured here 5 ft (see Figure -1).

At times bubbler systems or propellers have been used to control ice formation on the piling, while at other times the ice has been chopped away as it forms. One alternative is to do nothing and redrive the piling in the spring.

This CETN describes another alternative to solve the ice problem which is wrapping a plastic jacket around the piling.

The jacket, composed of patented carbon black impregnated polyethylene, is designed to fit standard piling with a simple wrap-around, nail-in

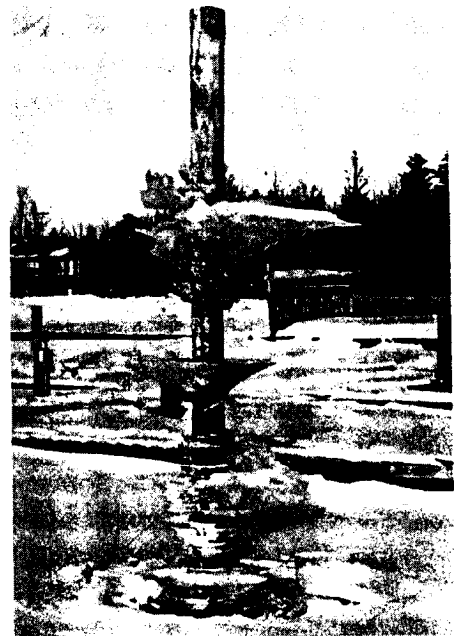


Figure 1. Pile Being Lifted
By Ice Freezing and Jacking

instaliation--(see Ngure 2). It is molded to conform to the cylindrical shape of a piling and is nailed in place using simple hand tools. The jacket has internally molded raised nodules graduated to create a reverse piling taper. This allows the ice sheet to move along the jacket as the water level changes, preventing the pile from being lifted from the bottom. The black jacket resists ice adhesion and absorbs heat from the sun, which helps melt the surrounding ice.

There are certain conditions under which the jacket may not be totally effective. These conditions include installation on piling not driven to the depth necessary to obtain minimum uplift resistance and installation on floating dock systems where there will be chafing forces on the jacket. Nor is it recommended where there is a combined tide, seiche, and ice thickness exceeding 5 ft. The bottom of the jacket must extend below the lowest low water level to prevent ice from crushing the bottom of the jacket and lifting the piling.



Figure 2. The Ice Jacket

ADDITIONAL INFORMATION: For further technical information, contact Leonard Zabilansky of CRREL at (603) 646-4319 (FTS 836-4319) who has been involved in the testing of the jacket.